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DESCRIPTIONS OF NEW MARINE MOLLUSKS FROM PANAMA, WITH A FIGURE OF THE GENOTYPE OF ENGINA

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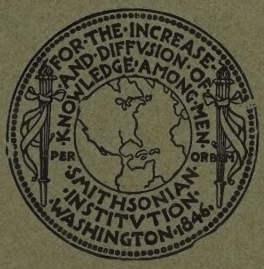

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Some time ago the United States National Museum received a sending of marine shells collected by C. D. Alleman, on Taboga Island, in the Gulf of Panama. Some of these made it necessary to subject certain other collections in the possession of the National Museum to critical examination, with the result that seven new species were discovered, which are herein described. In addition to this, thanks to the kind offices of Dr. Guy Robson, of the British Museum of Natural History, I have been able to obtain a photograph of the genotype of *Engina*, which I am here reproducing as Figure 6 of Plate 1. The genus *Eudaphne* is also here defined as new.

ANACHIS TABOGAENSIS, new species

PLATE 1, FIGURE 1

The shell is small, elongate-ovate. The nuclear wheels are flesh-colored; the rest marbled with chestnut-brown, pale-brown, orange, and flesh-colored spots of irregular size and spacing. The inside of the outer lip, except the denticles, is for the most part bright, dark rust brown; the denticles immediately behind its edge are yellowish white. Nuclear whorls 3.6, well rounded, smooth, and separated by a moderately impressed suture forming a rather conspicuous apex. The postnuclear whorls are crossed by low, rather strong, slightly protractively slanting axial ribs, of which 16 occur upon the first and second, 18 upon the third, 20 upon the fourth and the last turn. The spaces separating these axial ribs are less than half the width of the ribs. In addition to the axial ribs the whorls are marked by threadlike incremental lines, which are not closely crowded and which are present on the ribs and intercostal spaces. The spiral sculpture between the summit and the periphery consists of four equal and equally spaced incised spiral lines, which pass over the ribs and intercostal spaces and render the spaces between them on the ribs weakly tuberculated. Periphery well rounded. Base well

rounded, marked by the continuation of the axial ribs, which extend to the columella and five equal and equally spaced incised spiral lines, which equal those of the spire in strength but are a little more closely spaced than those. The ribs here as on the spire are rendered weakly tuberculated by the incised spiral lines. Columella about as long as the base, very stout, marked by seven equal strongly incised spiral lines, which make the spaces between them appear as equal, low cords. Aperture irregularly lunate, decidedly channeled anteriorly and slightly so posteriorly. Outer lip decidedly thickened immediately behind the edge, bearing eight teeth on the inside. The posterior of these teeth is more than double the width of the next three, which are subequal. The four anterior teeth are crowded on the basal fourth of the outer lip; they are also of equal size, and less than one-fourth the size of those posterior to them. The inner lip is reflected as a thick callus over the columella. The parietal wall on its anterior half is covered with a thin callus, while on its posterior half it bears a thick lumplike callus, which joins it to the outer lip at the posterior angle of the aperture.

Type.—U.S.N.M. No. 368143, collected by C. D. Alleman on Taboga Island, Panama. It has almost eight whorls, and measures: Length, 7 mm.; diameter, 3.3 mm. U.S.N.M. No. 368166 contains 25 topotypes.

ANACHIS DALLI, new species

PLATE 1, FIGURE 2

The shell is small, ovate, and pale yellowish, with an interrupted zone of large chestnut-colored spots immediately above the periphery and a second zone of interrupted spots of the same color halfway between the last and the tip of the base. There is also a zone of white, which girdles the whorls immediately posterior to the dark zone on the spire. This light zone occupies about two-thirds of the space between the dark zone of spots and the summit. Interior of aperture of the same color as the outside. Nuclear whorls 3, strongly rounded, separated by a moderately impressed suture, smooth, forming a small pointed apex. Postnuclear whorls moderately well rounded, narrowly shouldered at the summit, crossed by very slightly protractively slanting axial ribs, of which 16 occur upon all the whorls. The spaces separating the axial ribs are about as wide as the ribs and are crossed by fine, closely spaced incremental lines. The spiral sculpture consists of moderately strongly incised spiral lines, of which the first marks the posterior limit of the white spiral band. This incised line is a little stronger than the rest and passing over the ribs gives them a beadlike effect at the summit. The second incised spiral line is a little anterior to the posterior edge of the dark zone, which is crossed by two more

incised spiral lines. The fourth and last incised spiral line on the spire marks the anterior termination of the dark spots. In addition to these incised spiral lines, the entire spire and base are marked by microscopic, closely spaced, incised spiral lines, which, in combination with the incremental lines, lend to the outer surface a very fine clothlike sculpture. Periphery well rounded. Base short, well-rounded, marked by the continuation of the axial ribs and six equal and equally spaced incised spiral lines, which equal those of the spire in strength. Columella short, stout, marked by 10 spiral cords, which grow successively weaker from the posterior anteriorly, the last two at the tip of the columella being mere threads. Aperture sublunate, decidedly channeled anteriorly and feebly so at the posterior angle. Outer lip becoming much thickened immediately within the edge, provided with eight teeth on the inside, which grow progressively weaker from the posterior anteriorly. Inner lip forming a thick callus that is reflected over the columella. Parietal wall also covered by a thick callus, which joins the outer lip at the posterior angle of its aperture.

Type.—U.S.N.M. No. 368144, collected by C. D. Alleman on Taboga Island, Panama. It has 8 whorls and measures: Length, 6 mm.; diameter, 3 mm. U.S.N.M. No. 368167 contains 4 topotypes from the same source, while U.S.N.M. No. 331819 contains a single specimen collected by Dr. James Zetek on the same island. This was previously misidentified as *Anachis pygmaea* Sowerby. It bears collector's number 541.

EUDAPHNE, new genus

PLATE 1, FIGURE 3

The shell is very elongate-ovate and small. The nuclear whorls with sinusigerid sculpture. The early postnuclear whorls with strong axial riblets and strong spiral lirations, the junction of which produces a nodulose sculpture. On the last turn the axial riblets disappear or become obsolete, leaving the spiral sculpture only. The sinus is immediately below the suture and is moderately deep and broad. Inner lip and the inner portion of the parietal wall covered by a thin smooth callus. Operculum unknown.

Type species.—*Eudaphne allemani* Bartsch.

Range.—This group ranges from California to Panama.

EUDAPHNE ALLEMANI, new species

PLATE 1, FIGURE 3

The shell is small, very elongate-conic, and pale brown blotched and variegated with yellowish white. Of the nuclear whorls two and one-third remain in the type showing a sinusigerid sculpture,

which passes abruptly into the postnuclear sculpture without intermediate stages. The postnuclear whorls are marked by slightly protractively slanting, rather broad axial ribs, which are strongest on the early turns and which become enfeebled on the later and are quite obsolete on the last whorl. Of these ribs 11 occur upon the first postnuclear turn, 12 upon the second, 14 upon the third, 18 upon the fourth, while upon the next they are quite poorly expressed and irregular. In addition to the strong axial ribs, the entire surface of the whorls on spire and base is marked by numerous fine axial threads. The spiral sculpture also presents considerable variation. On the first whorl there are two strong spiral cords, one on the middle of the whorl, the other near the periphery. These cords are almost keels and render their junction with the axial ribs decidedly tuberculated. On the second turn two slender spiral threads appear between the summit and the first cord, and a third is present between the two strong cords. These threads become much more strongly developed upon the next whorl. On the fourth turn the strong keels are decidedly reduced almost equal to the rest of the spiral cords, of which 12 are here present between summit and suture. These are not all of the same strength, the intercalated threads being a little weaker than the rest. The fifth whorl shows 15 spiral threads, while on the last 23 are present between the summit and the periphery. Here they are subequal and subequally spaced, the spaces separating them being about equal to the spiral threads. Suture moderately constricted. Periphery well rounded. Base gently rounded, marked by 25 spiral threads, which are alternately strong and feeble. Columella moderately short, marked by 14 very oblique spiral threads. Aperture elongate-ovate, decidedly channeled anteriorly with a moderately broad and moderately deep sinus immediately below the summit on the outer lip; outer lip evenly curved, moderately thin at the edge, which is rendered finely denticulate by the spiral threads on the outside; inner lip and parietal wall marked by a slightly impressed smooth area, resembling a callus.

Type.—U.S.N.M. No. 368134, collected by C. D. Alleman on Taboga Island, Panama. It measures: Length, 12.8 mm.; diameter, 4.5 mm.

Remarks.—*Daphnella clathrata* Gabb appears to belong here, also an undescribed species from the Gulf of California.

MITRA (SCABRICOLA) MARSHALLI, new species

PLATE 1, FIGURE 4

The shell is rather small, elongate-ovate, and dark chestnut-brown. The early whorls badly eroded in the type. Those remaining subtabulatedly shouldered at the summit; the rest only very slightly curved. The whorls are marked by rather strong, almost

vertical, axial ribs, of which 13 are present on each of the last two turns. They are almost as broad as the spaces that separate them. In addition to these ribs numerous, very closely spaced incremental lines are present, which appear like slender axial threads. In addition to the axial sculptures the whorls are marked by strongly incised spiral lines, of which four occur between the summit and the suture. The first two near the summit are a little more distantly spaced than the next two. The spaces between these incised lines appear as moderately elevated cords, and their junctions with the axial ribs form low, well-rounded nodules, the first set of which is at the angle of the shoulder at the summit, which it renders feebly crenulated. Periphery well rounded. Base marked by the continuation of the axial ribs, which become somewhat enfeebled anteriorly, and six incised spiral lines, which are consecutively a little more closely spaced from the posterior to the anterior part of the base. The spaces between these incised lines also form low cords, and their junction with the axial ribs likewise produces well-rounded tubercles. The columella is short and is marked by eight closely approximated moderately strong, low spiral cords. The axial ribs scarcely extend upon the columella. Aperture elongate, decidedly channeled anteriorly, outer lip rather thick, rendered wavy by the spiral cords. The inner lip forms a moderately thick callus, which is reflected over half of the columella and also extends over the parietal wall. The inner lip is provided with three rather strong obliquely slanting folds, of which the posterior is the strongest, and the other two consecutively a little weaker.

Type.—U.S.N.M. No. 368135, collected by C. D. Alleman on Taboga Island, Panama. It has six whorls remaining, and measures: Length, 14.3 mm.; diameter, 6 mm.

Remarks.—There are several more species in our collection from the west coast belonging to this section of *Mitra*, but they appear to be all undescribed. It is possible that *Mitra solitaria* C. B. Adams may belong in this group. The present form seems to differ from that in having fewer axial ribs.

RISSOINA ALLEMANI, new species

PLATE 1, FIGURE 5

The shell is rather large. The early whorls are decollated in the type. The first of the remaining postnuclear whorls is angulated halfway between the summit and suture. This angulation is less conspicuous on the next turn and disappears entirely on the following and succeeding whorls, which are quite well rounded. The first and second turns are appressed at the summit, while the succeeding turns are feebly shouldered, the shoulder there being rendered crenu-

lated by the ribs. On the first and second of the remaining turns strong, distantly spaced, decidedly retractively slanting axial ribs are present. On the following turns these ribs become sigmoid, a little less strongly developed, and much more closely approximated. The intercostal spaces on the first and second turns are broad, and are marked by two spiral cords a little stronger than the rest at the angulation. The shoulder between this angulation and the summit on the first and second turn is crossed by about 10 slender spiral threads, while the space between the suture and the strong thread anterior to it at the angulation is marked by 5 spiral threads, which are considerably stronger than those on the summit. On the three remaining turns the stronger threads corresponding to the angulation in the middle of the turn become reduced, and only equal those anterior to it in strength. There are 10 of these subequal threads present, while the 10 slender threads on the posterior portion of the turn remain feeble. On the next postnuclear whorl this differentiation of spiral sculpture almost disappears, and we find 14 equal and almost equally spaced, rather strong spiral threads and a few feeble incised lines near the summit present between the summit and suture. On the last whorl 16 subequal and subequally spaced spiral threads are present between periphery and summit. Here the deeply impressed pits between the ribs and the spiral threads show finely incised spiral lines. Base slightly produced, marked by a continuation of the axial ribs, which become evanescent on the anterior portion of the base, and by 13 strong spiral threads, of which those on the posterior portion of the short columella are a little heavier than those posterior to it. Anterior to these strong threads there is a series of six spiral threads that are much finer and much more closely appoximated than those posterior to it. These are closely crowded at the extreme anterior tip of the columella. Aperture rather large, auriculate; the sinus at the posterior angle very pronounced, less channeled anteriorly. Outer lip abruptly expanded, very much thickened and separated by a varix a little posterior to its edge. The inner edge of the callus becomes somewhat attenuated near the posterior angle, and the attenuation is sufficiently abrupt to give it a somewhat toothed aspect. The columella is reflected as a moderately broad callus and the parietal wall is covered by a strong thick callus which joins the outer lip at the posterior angle.

Type.—U.S.N.M. No. 368132, collected by C. D. Alleman on Taboga Island, Panama. It has 5.1 whorls remaining, and measures: Length, 7.4 mm.; diameter, 3.2 mm.

Remarks.—The species, while suggesting *Rissoina zeltneri* De Folin, which also comes from Panama, is nevertheless quite different in sculpture and in general form and the shape of the early whorls, and the strong sculpture differentiates it from all other species.

Genus ENGINA Gray

PLATE 1, FIGURE 6

The genus *Engina* was defined by Gray in the Zoology of Beechey's Voyage (1839, pp. 112–113). Two species were mentioned here, both cited as coming from the Atlantic Ocean. The first of these, *Engina zonata*, was later designated as type by Gray. Since there seems to have been some confusion about the group, I take pleasure in publishing a photograph of the type species obtained from the British Museum of Natural History, where it is resting, which has been made available to me through the courtesy of Doctor Robson. This figure is reproduced on Plate 1, Figure 6. The specimen measures 27.5 mm. in length.

There are several species of *Engina* from the Panama region, which appear to be undefined. I shall therefore give descriptions and figures of some of these below.

ENGINA PANAMENSIS, new species

PLATE 1, FIGURE 7

The shell is of medium size. The nuclear whorls are white, the rest of the shell marbled with dark chestnut-brown, yellowish white, and orange. Interior of aperture bluish white. Nuclear whorls 2.6, strongly rounded, smooth, separated by a moderately impressed suture, forming a moderately elevated apex. The postnuclear whorls are appressed at the summit, leaving the suture inconspicuous, and are marked by broad, low, rounded axial ribs, of which 11 occur upon all the turns. These ribs are crossed by numerous rough incremental lines. The spiral sculpture consists of three strong cords, which are equal on the first whorls and which render the axial ribs decidedly nodulose at their junction. Beginning with the second whorl, the spiral cord at the summit becomes enfeebled and the two anterior to it much increased in strength. On the succeeding turn a third spiral cord appears posterior to the suture, which is almost as strong as the two preceding it, the posterior spiral cord near the summit practically disappearing. These strong spiral cords render the ribs decidedly nodulose, the nodules having their long axis parallel with the spiral sculpture. In addition to the strong cords the entire surface of the shell, on spire and base, is marked by rather strong, more or less irregularly developed spiral threads, which are a little heavier than the incremental lines, the two forming a reticulated pattern. Periphery rendered somewhat angulated by the third spiral cord. Base moderately rounded, between the insertion of the columella and the periphery, marked by three almost equal and equally spaced spiral cords, which are almost as strong as the anterior one

posterior to the periphery. These spiral cords are most conspicuous on the ribs, which they likewise render nodulose. The spaces between the spiral cords are a little more than twice as wide as the cords, and are marked by moderately strong spiral threads, of which five are present between all the spiral cords. The columella is short and thick and is marked posteriorly by the feeble continuation of the axial ribs and two moderately strong spiral cords and the finer spiral threads between them. The anterior three-fourths of the columella is marked by 10 closely approximated, rather coarse, low, rounded spiral threads. Aperture narrow, decidedly channeled anteriorly, weakly so posteriorly. The outer lip is thickened immediately behind the edge, bearing on the inside a strong oblique fold a little below the posterior angle of the aperture. Anterior to this are two quite strong and closely approximated and partly fused denticles, and anterior to these are two small denticles followed by a larger one at the beginning of the anterior sinus. The inner lip consists of a thick callus which is reflected over the columella and the parietal wall, which forms a deep oblique fold opposite the posterior fold of the outer lip. Twelve short oblique denticles, which become consecutively a little wider from the posterior anteriorly, are also present anterior to this deep fold, the most anterior one being about opposite the anterior thread on the outer lip. The large fold on the parietal callus and that on the posterior part of the outer lip extend strongly inward and form a decided constriction of the posterior portion of the aperture.

Type.—U.S.N.M. No. 381885, from Panama. It has the last nuclear whorl remaining and 6.8 postnuclear whorls, and measures: Length, 19.6 mm., diameter, 17 mm.

Remarks.—In addition to the type, U.S.N.M. No. 32159 contains two specimens collected by Bridges at Panama; U.S.N.M. No. 32168 has four additional specimens obtained by the same collector in the same place; and U.S.N.M. No. 3757b contains the young specimen that has furnished us with the description of the nucleus, also from Panama.

ENGINA TABOGAENSIS, new species

PLATE 1, FIGURE 8

The shell is small. The nuclear whorls are white. The ground color of the postnuclear whorls is yellowish; first row of tubercles near the summit dark chestnut-brown, the rest very dark brown. Occasionally there are spots of flesh color on the sides of the dark tubercles. The aperture is yellowish. Nuclear whorls 2.8, strongly rounded, smooth, forming an almost mucronate apex. The postnuclear whorls

are marked by strong axial ribs, which are most strongly developed at the periphery and which diminish in strength both anteriorly and posteriorly. Of these ribs 11 are present on all the turns. The first and second postnuclear whorls are marked by three spiral cords, which are almost equal in strength, on the third and fourth turns the anterior of these three cords becomes much emphasized and the posterior one enfeebled. On the last whorl a fourth cord is apparent. The three at the periphery form strong humps. In addition to these strong spiral cords, the entire surface of spire and base is marked by finer spiral threads, of which eight are present between the summit and the second spiral cord; three are present on the second spiral cord, and two in the space between the second and third; there is one strong thread on the third spiral cord and three fine threads between the third and fourth; the fourth also has a strong spiral thread on its summit. The base is short, moderately well rounded and marked by a continuation of the axial ribs and three strong spiral cords almost as strong as the anterior one of the spire. The space between the supraperipheral and infraperipheral cord is crossed by five spiral threads, while the space between the first and second basal cord is also crossed by five spiral threads; the space between the second and third basal cords is marked by three spiral threads. The columella is short and thick and is marked on the posterior half by three strong spiral cords a little less in strength than those on the base, but in continuation of that series. Three spiral threads are present between the stronger cords on the posterior half of the columella. The anterior half of the columella is marked by eight closely approximated slender spiral cords. The incremental lines and the spiral threads on spire and base render the general surface slightly reticulated. Aperture of irregular outline, strongly channeled anteriorly, feebly so posteriorly. Outer lip slender at the edge, reenforced within immediately behind the edge, bearing a strong oblique fold near the posterior angle and a little anterior to this two approximated denticles, which are partly fused. Anterior to these there are two smaller denticles, and a heavy denticle marks the posterior termination of the canal at the anterior portion of the aperture. The inner lip is reflected over the columella as a thick callus, which also extends over the parietal wall. This callus bears two slender threads near the posterior angle, followed by an elongate thread much heavier than these two, which faces the heavy thread at the posterior angle on the outer lip and constricts this part of the aperture almost into a canal; anterior to this fold are five slender oblique threads equaling the posterior two in strength, while on the columellar wall eight slender, rounded denticles are present.

Type.—U.S.N.M. No. 368154, collected by C. D. Alleman on Taboga Island, Panama. It has 2.8 nuclear whorls and 5.8 postnuclear whorls, and measures: Length, 12.3 mm.; diameter, 7.8 mm.

Remarks.—This species differs from *Engina panamensis* by its much smaller size, its coloration, and the denticulation of the aperture. U.S.N.M. No. 368153 contains 11 topotypes collected by C. D. Alleman, while U.S.N.M. No. 204082 contains a specimen collected by the United States Bureau of Fisheries Steamer *Albatross* at Taboquilla Island, Bay of Panama.

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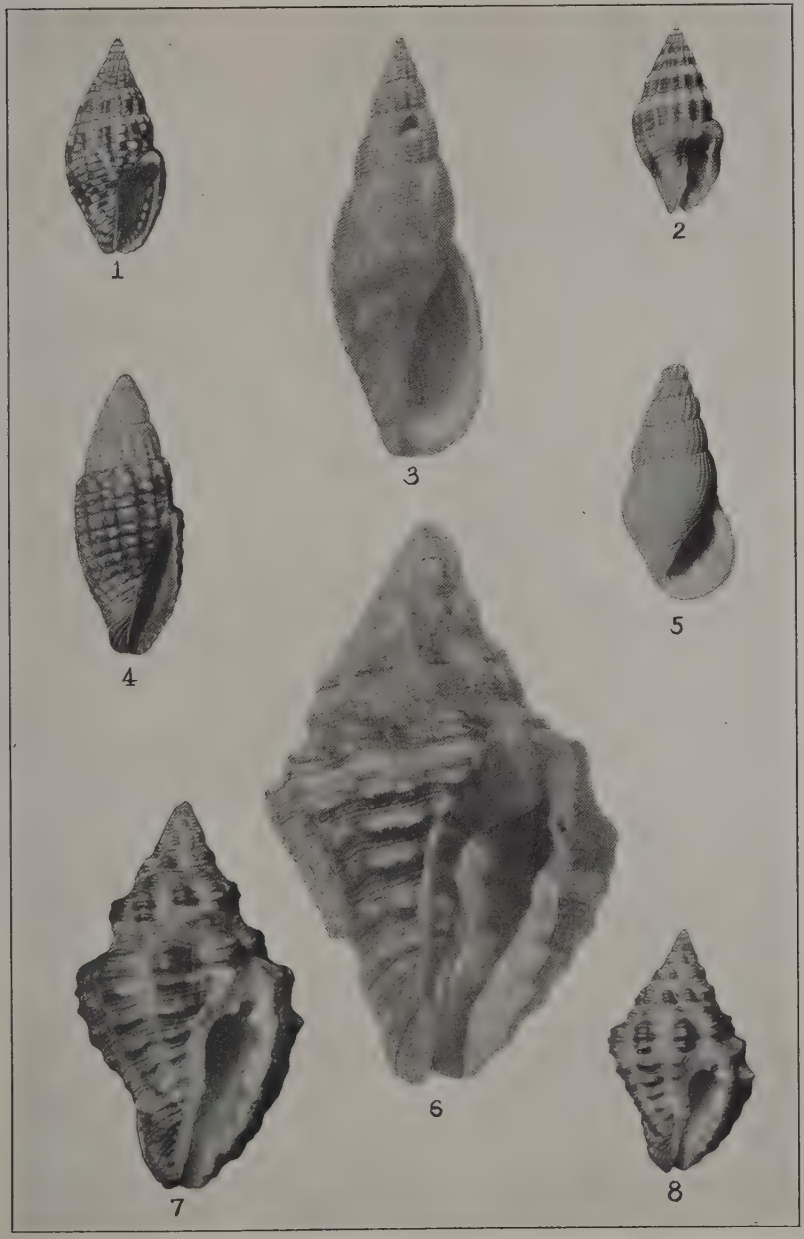

PANAMA MARINE MOLLUSKS

1. *Anachis tabogaensis*, new species; 2, *A. dalli*, new species; 3, *Eudaphne allemani*, new genus and species; 4, *Mitra (Scabricola) marshalli*, new species; 5, *Rissoina allemani*, new species; 6, genotype of *Engina* Gray from the British Museum of Natural History; 7, *Engina panamensis*, new species; 8, *E. tabogaensis*, new species.